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**INFLUENCE OF REGIONAL ANESTHETIC TECHNIQUES ON  
MATERNAL AND NEONATAL OUTCOMES: LITERATURE  
BASED REVIEW**

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**Publication Date: January 2023**

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**ABSTRACT**

**Purpose of the study:** The study sought to examine the influence of regional anesthetic techniques on maternal and neonatal outcomes.

**Methodology:** The study was literature based. The study used the findings of the previous studies to make conclusions regarding the influence of regional anesthetic techniques on maternal and neonatal outcomes.

**Findings:** The study found that regional anesthetic techniques, such as epidurals and spinal blocks, have been shown to positively impact maternal and neonatal outcomes during childbirth. Regional anesthesia allows for more targeted pain relief during labor and delivery, reducing the need for general anesthesia, which can have more severe side effects for both the mother and the baby. In addition, regional anesthesia allows the mother to be awake and alert during delivery, facilitating bonding with the newborn and breastfeeding. Additionally, regional anesthesia can improve maternal blood pressure control during delivery, which can decrease the risk of maternal hemorrhage. Maternal and neonatal outcomes are essential indicators of the health and well-being

of women and newborns. Maternal outcomes include measures such as maternal mortality and morbidity, while neonatal outcomes include measures such as neonatal mortality and morbidity.

**Conclusion:** The study concluded that regional anesthetic techniques have a significant influence on maternal and neonatal outcomes.

**Recommendations:** The study recommended that regional anesthetic techniques should be embraced to enhance maternal and neonatal outcomes. Continuous monitoring of the mother and fetus during the procedure is important to ensure safety. In addition, there is a need for post-operative care to ensure the best outcomes for both the mother and the baby. The patient's medical history, including any pre-existing conditions such as hypertension or diabetes, should be taken into account when determining the appropriate type of anesthesia.

**Keywords:** *Anesthetic Regional anesthetic techniques, maternal and neonatal outcomes*

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## **BACKGROUND OF THE STUDY**

Maternal and neonatal outcomes are essential indicators of the health and well-being of women and newborns. Maternal outcomes include the health and well-being of the mother during pregnancy, childbirth, and the postpartum period (Iddrisu & Khan, 2021). Maternal outcomes include measures such as maternal mortality and morbidity (e.g., maternal infections, complications during pregnancy and childbirth), while neonatal outcomes include measures such as neonatal mortality and morbidity (e.g., preterm birth, low birth weight) (Wu, Dian & Zhang, 2018). These outcomes are important not only for the health of the mother and newborn but also for the overall health and development of the community. Improving maternal and neonatal outcomes can also have a positive impact on reducing poverty and enhancing economic development (Dunn, Zhang, Sia, Assam, Tagore & Sng, 2016).

Monitoring and improving maternal and neonatal outcomes is, therefore, a key priority for global health and development efforts. The maternal and neonatal outcomes are important indicators of the overall health and well-being of mothers and their newborns and are closely monitored in obstetrics and pediatrics. Improving maternal and neonatal outcomes is a crucial goal in maternal and child health programs worldwide (Gizzo, Noventa, Fagherazzi, Lamparelli, Ancona, Di Gangi & Nardelli, 2014). Countries are using technology to increase the quality and efficiency of maternal and neonatal outcomes. It is noted by some scholars such as Lim, Facco, Nathan, Waters, Wong and Eltzschig (2018), Sultan, Habib, Cho and Carvalho (2015), Portela, Verdier and Otero

(2018), Iddrisu and Khan (2021) and Jaafarpour, Taghizadeh, Shafiei, Vasigh and Sayehmiri (2020) that regional anesthetic techniques are significant in maternal and neonatal outcomes.

Regional anesthesia numbs a specific area of the body, rather than the entire body, during surgery or other medical procedures (Iddrisu & Khan, 2021). The most common regional anesthetic techniques include epidural anesthesia, spinal anesthesia, a paracervical block and pudendal block (Portela, Verdier & Otero, 2018). Epidural anesthesia involves injecting an anaesthetic medication into the epidural space in the lower back to numb the lower half of the body, spinal anesthesia involves injecting an anesthetic medication into the spinal fluid in the lower back to numb the entire lower half of the body and paracervical block involves injecting an anesthetic medication into the cervix to numb the lower part of the uterus and the cervix (Lim, Facco, Nathan, Waters, Wong & Eltzschig, 2018). The pudendal block involves injecting anesthetic medication into the pudendal nerve to numb the vaginal area. It is important to note that these techniques are only suitable for some and are used based on the mother's need and the anesthesiologist's availability.

Regional anesthetic techniques offer several advantages over general anesthesia, such as the reduced risk of complications, faster recovery and less postoperative pain. They are also a safer and more effective alternative to general anesthesia in certain patients, such as those with a difficult airway or who are elderly or obese (Sultan, Habib, Cho & Carvalho, 2015). Regional anesthesia techniques have been shown to have several benefits for both maternal and neonatal outcomes during childbirth. These techniques provide effective pain relief for the mother during labor and delivery and may also reduce the risk of certain complications, such as cesarean delivery and instrumental deliveries (Gizzo, Noventa, Fagherazzi, Lamparelli, Ancona, Di Gangi & Nardelli, 2014). Additionally, regional anesthesia techniques have been shown to benefit neonatal outcomes, such as improved Apgar scores and decreased rates of neonatal acidemia.

Nonetheless, despite the strength of regional anesthesia techniques in pain management during childbirth, they can cause some risks (Iddrisu & Khan, 2021). Regional anesthesia can cause the blood pressure to drop, leading to decreased blood flow to the uterus and fetus, and may require interventions such as fluid replacement or ephedrine to correct (Chumpathong, Sirithanetbhol, Salakij, Visalyaputra, Parakkamodom & Wataganara, 2016). Regional anesthesia can also cause fetal distress, characterized by decreased fetal heart rate and poor fetal oxygenation. This can be

managed with careful monitoring and appropriate interventions, such as fetal scalp electrodes or cesarean section.

Moreover, it is noted by Dyer, Maswime, Rodseth, Van Dyk, Kluyts, and Assefa (2019) that regional anesthesia techniques can cause nerve injury, such as temporary or permanent numbness or weakness in the legs. In addition, some individuals may have an allergic reaction to the local anesthetic used in the regional anesthesia and some women may experience post-dural puncture headaches. In some cases, regional anesthesia may fail to provide adequate pain relief and an alternative method of pain management, such as general anesthesia or patient-controlled analgesia, may be needed (Edipoglu, Celik, Marangoz & Orcan, 2018). It is based on this background that the current study sought to examine the influence of regional anesthetic techniques on maternal and neonatal outcomes. The study relied upon the published work (literature review) to make conclusions and inferences regarding the study objective.

## **LITERATURE REVIEW**

Lim, Facco, Nathan, Waters, Wong and Eltzschig (2018) looked at the impact of obstetric anesthesia on maternal and neonatal outcomes. The outcome of the investigation found that regional anesthetic techniques, such as epidurals and spinal blocks, have been shown to have a positive impact on maternal and neonatal outcomes during childbirth. These techniques can provide pain relief for the mother during labor and delivery, which can lead to decreased stress and improved maternal satisfaction. Additionally, the use of regional anesthesia can also reduce the need for general anesthesia, which can be associated with increased maternal and neonatal complications. In terms of neonatal outcomes, the use of regional anesthesia has been associated with decreased incidence of fetal distress, meconium aspiration, and neonatal intensive care unit (NICU) admissions. However, there are also potential complications that can occur with the use of regional anesthesia, such as maternal hypotension and fetal bradycardia, which must be carefully monitored and managed by the healthcare provider.

Sultan, Habib, Cho and Carvalho (2015) showed that regional anesthetic techniques provide pain relief for the mother during labor and delivery, which can lead to decreased stress and improved maternal satisfaction, helping in the overall well-being of the mother. Additionally, the use of regional anesthesia can also reduce the need for general anesthesia, which can be associated with increased maternal and neonatal complications. This can help to minimize the risk of maternal and

neonatal morbidity and mortality. Moreover, the use of regional anesthesia techniques also allows for the mother to be awake and alert during the delivery process, allows for a more positive and memorable birth experience, it also allows the mother to be more involved in the delivery process and to be better able to bond with her newborn child. Overall, regional anesthetic techniques play a vital role in improving maternal and neonatal outcomes during childbirth and are an important part of obstetric care.

Portela, Verdier and Otero (2018) established that regional anesthetic techniques are important because they provide pain relief to a specific area of the body without affecting consciousness. This allows for surgery or other procedures to be performed with minimal discomfort for the patient, and can also reduce the need for general anesthesia or opioid pain medications. Additionally, regional anesthetic techniques can also provide postoperative pain relief and help improve rehabilitation outcomes. It also allows to avoid the side effect of general anesthesia. It is important to note that although there are many potential benefits to regional anesthesia, it is not appropriate for all women, and the risks and benefits should be carefully considered before deciding on a particular anesthesia technique.

Iddrisu and Khan (2021) reported that regional anesthetic techniques, such as epidural anesthesia, can provide many advantages during childbirth. Regional anesthetic techniques can provide effective pain relief during labor and delivery, allowing for a more comfortable birth experience for the mother. In addition, with regional anesthesia, the mother can still move around and change positions during labor, which can help progress the delivery and reduce the risk of complications. Epidural anesthesia can help control blood pressure, which is particularly beneficial for mothers who have high blood pressure or are at risk of developing it during labor. Further, regional anesthesia can reduce the need for other interventions such as forceps or vacuum-assisted delivery, which can help reduce the risk of complications for both the mother and the baby. Reduced need for post-delivery pain management: After delivery, regional anesthesia can help reduce the need for additional pain management, which can help minimize the risk of side effects and complications associated with pain medications. Regional anesthesia can help reduce stress on the baby during delivery, which can improve outcomes for the baby.

Jaafarpour, Taghizadeh, Shafiei, Vasigh and Sayehmiri (2020) reported that regional anesthesia allows for more targeted pain relief during labor and delivery, reducing the need for general

anesthesia, which can have more serious side effects for both the mother and the baby. Regional anesthesia can provide effective pain relief during labor and delivery, leading to improved maternal satisfaction and a more positive birth experience. Further, general anesthesia can cause neonatal depression, which can lead to respiratory distress and other complications. It reduces the risk of cesarean delivery. Regional anesthesia can reduce the likelihood of cesarean delivery, which can lead to a faster recovery and fewer complications for the mother. It can reduce maternal blood loss. Regional anesthesia can reduce the amount of blood loss during delivery, which can be beneficial for both the mother and the baby.

Gizzo, Noventa, Fagherazzi, Lamparelli, Ancona, Di Gangi and Nardelli (2014) established that regional anesthesia techniques, such as spinal or epidural anesthesia, are preferred for maternal anesthesia during childbirth because they provide pain relief while allowing the mother to remain awake and alert. This allows her to participate in the birthing process and bond with her baby immediately after birth. Regional anesthesia also reduces the risk of maternal nausea and vomiting, which can occur with general anesthesia. Additionally, regional anesthesia can be used in combination with a lower dose of opioids, which can reduce the risk of fetal depression and other side effects. The study concluded that the provider administering the anesthesia should be experienced and trained in the specific technique being used. Continuous monitoring of the mother and fetus during the procedure is important to ensure safety. In addition, there is a need for post-operative care: Proper post-operative care is important to ensure the best outcomes for both the mother and the baby.

Scarf, Rossiter, Vedam, Dahlen, Ellwood, Forster and Homer (2018) reported that regional anesthetic techniques for maternal labor and delivery involve numbing a specific area of the body to provide pain relief during childbirth. The most common regional anesthetic techniques used during labor and delivery include epidural anesthesia, spinal anesthesia, paracervical block and pudendal block. Epidural anesthesia involves injecting an anesthetic medication into the epidural space in the lower back to numb the lower half of the body. Spinal anesthesia involves injecting an anesthetic medication into the spinal fluid in the lower back to numb the entire lower half of the body. Paracervical block involves injecting an anesthetic medication into the cervix to numb the lower part of the uterus and the cervix. Pudendal block involves injecting anesthetic medication into the pudendal nerve to numb the vaginal area. It is important to note that these techniques are

not suitable for everyone and are used based on the need of the mother and the availability of the anesthesiologist.

Chalet, Vielle, Verhaeghe, Corroenne, Legendre, Descamps and Bouet (2022) indicated there are several weaknesses of regional anesthetic techniques on maternal and neonatal outcomes. One of the weaknesses is that regional anesthesia can cause hypotension, which can lead to decreased blood flow to the uterus and placenta, potentially leading to fetal distress. Additionally, regional anesthesia can affect the duration of labor and the need for assisted delivery such as vacuum or forceps. There is also a risk of nerve injury or infection associated with regional anesthesia. Overall, while regional anesthesia can provide pain relief for the mother during labor, it should be used with caution to minimize potential risks to the mother and baby. It is important for the anesthesiologist to carefully evaluate the individual case and weigh the potential benefits and risks before administering a regional anesthetic.

Anaesthesiology and Zahir (2011) argued that regional anesthesia techniques, such as spinal or epidural anesthesia, have been shown in studies to have benefits for both maternal and neonatal outcomes during childbirth. These benefits may include reduced need for general anesthesia, lower risk of maternal fever and infection, improved fetal oxygenation, and shorter hospital stays for both mother and baby. Additionally, regional anesthesia can provide more effective pain relief for the mother during labor and delivery, which can lead to improved outcomes for both the mother and the baby. Due to these benefits, more doctors are choosing to use regional anesthesia techniques during childbirth.

Bhatia, Columb, Bewlay, Tageldin, Knapp and Qamar (2021) noted that regional anesthesia techniques, such as spinal and epidural anesthesia, have been shown to have benefits for maternal and neonatal outcomes in certain situations. These techniques allow for pain relief during labor and delivery without the need for general anesthesia, which can have potential side effects for both the mother and the baby. Additionally, regional anesthesia can provide better pain control for cesarean delivery and may also reduce the risk of certain complications such as postpartum hemorrhage. However, it is important to note that the decision to use regional anesthesia should be made on a case-by-case basis and in consultation with an anesthesia provider and obstetrician.

Thangaswamy, Kundra, Velayudhan, Aswini and Veena (2018) reported that regional anesthetic techniques, such as spinal and epidural anesthesia, have been widely accepted for maternal and

neonatal outcomes because they offer a number of benefits compared to general anesthesia. For example, regional anesthesia allows the mother to be awake and alert during delivery, which can facilitate bonding with the newborn and breastfeeding. Additionally, regional anesthesia can improve maternal blood pressure control during delivery, which can decrease the risk of maternal hemorrhage. Furthermore, Regional anesthesia can also reduce neonatal depression, as well as the need for neonatal resuscitation and intensive care in comparison to General Anesthesia.

Obi and Umeora (2018) argued there are several factors that should be considered before administering regional anesthetic techniques on maternal and neonatal outcomes. The patient's medical history, including any pre-existing conditions such as hypertension or diabetes, should be taken into account when determining the appropriate type of anesthesia. The position and presentation of the fetus, as well as the gestational age, should be considered when deciding on the best type of regional anesthesia to use. The length of time that the anesthesia is administered can affect the outcome, so it should be considered before the procedure. In addition, the dosage and type of medication used for the regional anesthesia should be considered, as it can affect the maternal and fetal outcomes. Overall, a thorough assessment of the patient and the use of appropriate techniques and monitoring can ensure the best possible outcomes for both the mother and the baby during regional anesthesia.

## **RESEARCH METHODS**

The study was literature based. A literature-based study is a research method that involves analyzing and interpreting existing literature on a particular subject. This study typically consists in reviewing and synthesizing existing research studies, articles, and other written materials rather than conducting new primary research. This approach can be used to gain a deeper understanding of a topic and generate new hypotheses for future research. The study used the findings of the previous studies to make conclusions regarding the influence of regional anesthetic techniques on maternal and neonatal outcomes.

## **RESULTS AND DISCUSSION**

The study found that regional anesthetic techniques, such as epidurals and spinal blocks have a positive impact on maternal and neonatal outcomes. Regional anesthesia allows for more targeted pain relief during labor and delivery, reducing the need for general anesthesia, which can have more severe side effects for both the mother and the baby. The regional anesthesia allows the



mother to be awake and alert during delivery, facilitating bonding with the newborn and breastfeeding. Additionally, regional anesthesia can improve maternal blood pressure control during delivery, which can decrease the risk of maternal hemorrhage. Furthermore, Regional anesthesia can also reduce neonatal depression, as well as the need for neonatal resuscitation and intensive care in comparison to General Anesthesia. The use of regional anesthesia has been associated with decreased incidence of fetal distress, meconium aspiration, and neonatal intensive care unit (NICU) admissions. The use of regional anesthesia techniques can help to minimize the risk of maternal and neonatal morbidity and mortality.

Overall, regional anesthetic techniques are vital in improving maternal and neonatal outcomes during childbirth and are an essential part of obstetric care. Some regional anesthetic techniques include epidural anesthesia, spinal anesthesia, a paracervical block and a pudendal block. Epidural anesthesia involves injecting an anaesthetic medication into the epidural space in the lower back to numb the lower half of the body, spinal anesthesia involves injecting an anesthetic medication into the spinal fluid in the lower back to numb the entire lower half of the body and paracervical block involves injecting an anesthetic medication into the cervix to numb the lower part of the uterus and the cervix. The pudendal block involves injecting anesthetic medication into the pudendal nerve to numb the vaginal area. It is important to note that these techniques are only suitable for some and are used based on the mother's need and the anesthesiologist's availability.

There are some potential weaknesses of regional anesthetic techniques on maternal and neonatal outcomes. The regional anesthesia can cause hypotension, which can lead to decreased blood flow to the uterus and placenta, potentially leading to fetal distress. The anesthesia can affect the duration of labor and the need for assisted delivery such as vacuum or forceps. There is also a risk of nerve injury or infection associated with regional anesthesia. Generally, regional anesthetic techniques have critical importance on maternal and neonatal outcomes. These techniques can provide effective pain relief while allowing the mother to remain alert and able to participate in the birthing process. The techniques help to prevent complications such as cesarean delivery and instrumental vaginal delivery, leading to improved outcomes for both the mother and the baby.

## **CONCLUSION**

It is concluded that regional anesthetic techniques have a significant influence on maternal and neonatal outcomes. Regional anesthesia has a positive impact on maternal and neonatal outcomes.

Studies show that regional anesthesia techniques such as spinal or epidural anesthesia can decrease the need for general anesthesia, reduce the risk of maternal fever and infection, and improve the overall experience of childbirth for the mother. Additionally, regional anesthesia can also have benefits for the baby by reducing the risk of injury during delivery and improving the baby's initial adaptation to life outside the womb. However, it's important to consult with an anesthesiologist before making a final decision, as every person have different condition and requirement. Nonetheless, it is important to note that the specific technique used and the qualifications of the practitioner administering the anesthesia will also play a role in determining outcomes.

### **RECOMMENDATIONS**

It is recommended that regional anesthetic techniques should be embraced to enhance on maternal and neonatal outcomes. Regional anesthesia, such as spinal or epidural anesthesia, can provide pain relief during labor and delivery while allowing the mother to remain alert and able to participate in the birthing process. It is important that regional anesthesia should be discussed with an anesthesiologist before making a decision. Continuous monitoring of the mother and fetus during the procedure is important to ensure safety. In addition, there is a need for post-operative care to ensure the best outcomes for both the mother and the baby. The patient's medical history, including any pre-existing conditions such as hypertension or diabetes should be taken into account when determining the appropriate type of anesthesia. The position and presentation of the fetus, as well as the gestational age, should be considered when deciding on the best type of regional anesthesia to use. The length of time that the anesthesia is administered can affect the outcome, so it should be considered before the procedure. In addition, the dosage and type of medication used for regional anesthesia should be considered, as it can affect maternal and fetal outcomes.

### **REFERENCES**

- Anaesthesiology, H. F., & Zahir, J. (2011). Maternal and neonatal outcome after spinal versus general anaesthesia for caesarean delivery. *Ann Pak Inst Med Sci*, 7(3), 115-8.
- Bhatia, K., Columb, M., Bewlay, A., Tageldin, N., Knapp, C., Qamar, Y., (2021). Decision-to-delivery interval and neonatal outcomes for category-1 caesarean sections during the COVID-19 pandemic. *Anaesthesia*, 76(8), 1051-1059.

- Chalet, Y., Vielle, B., Verhaeghe, C., Corroenne, R., Legendre, G., Descamps, P., ... & Bouet, P. E. (2022). Comparison of neonatal outcomes of cesarean sections performed under primary or secondary general anesthesia: a retrospective study. *International Journal of Obstetric Anesthesia*, *50*, 103538.
- Chumpathong, S., Sirithanetbhol, S., Salakij, B., Visalyaputra, S., Parakkamodom, S., & Wataganara, T. (2016). Maternal and neonatal outcomes in women with severe pre-eclampsia undergoing cesarean section: a 10-year retrospective study from a single tertiary care center: anesthetic point of view. *The Journal of Maternal-Fetal & Neonatal Medicine*, *29*(24), 4096-4100.
- Dunn, C. N., Zhang, Q., Sia, J. T., Assam, P. N., Tagore, S., & Sng, B. L. (2016). Evaluation of timings and outcomes in category-one caesarean sections: a retrospective cohort study. *Indian journal of anaesthesia*, *60*(8), 546.
- Dyer, R. A., Maswime, S., Rodseth, R. N., Van Dyk, D., Kluyts, H. L., ... & Assefa, S. B. (2019). Maternal and neonatal outcomes after caesarean delivery in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. *The Lancet Global Health*, *7*(4), e513-e522.
- Edipoglu, I. S., Celik, F., Marangoz, E. C., & Orcan, G. H. (2018). Effect of anaesthetic technique on neonatal morbidity in emergency caesarean section for foetal distress. *PLoS One*, *13*(11), e0207388.
- Gizzo, S., Noventa, M., Fagherazzi, S., Lamparelli, L., Ancona, E., Di Gangi, S., ... & Nardelli, G. B. (2014). Update on best available options in obstetrics anaesthesia: perinatal outcomes, side effects and maternal satisfaction. Fifteen years systematic literature review. *Archives of gynecology and obstetrics*, *290*, 21-34.
- Iddrisu, M., & Khan, Z. H. (2021). Anesthesia for cesarean delivery: general or regional anesthesia—a systematic review. *Ain-Shams Journal of Anesthesiology*, *13*(1), 1-7.
- Jaafarpour, M., Taghizadeh, Z., Shafiei, E., Vasigh, A., & Sayehmiri, K. (2020). The effect of intrathecal meperidine on maternal and newborn outcomes after cesarean section: a systematic review and meta-analysis study. *Anesthesiology and Pain Medicine*, *10*(2).
- Lim, G., Facco, F. L., Nathan, N., Waters, J. H., Wong, C. A., & Eltzschig, H. K. (2018). A review of the impact of obstetric anesthesia on maternal and neonatal outcomes. *Anesthesiology*, *129*(1), 192-215.

- Obi, V., & Umeora, O. J. (2018). Anesthesia for emergency cesarean section: A comparison of spinal versus general anesthesia on maternal and neonatal outcomes. *African Journal of Medical and Health Sciences*, 17(1), 31-31.
- Portela, D. A., Verdier, N., & Otero, P. E. (2018). Regional anesthetic techniques for the pelvic limb and abdominal wall in small animals: a review of the literature and technique description. *The veterinary journal*, 238, 27-40.
- Scarf, V. L., Rossiter, C., Vedam, S., Dahlen, H. G., Ellwood, D., Forster, D., ... & Homer, C. S. (2018). Maternal and perinatal outcomes by planned place of birth among women with low-risk pregnancies in high-income countries: a systematic review and meta-analysis. *Midwifery*, 62, 240-255.
- Sultan, P., Habib, A. S., Cho, Y., & Carvalho, B. (2015). The Effect of patient warming during Caesarean delivery on maternal and neonatal outcomes: a meta-analysis. *BJA: British Journal of Anaesthesia*, 115(4), 500-510.
- Thangaswamy, C. R., Kundra, P., Velayudhan, S., Aswini, L. N., & Veena, P. (2018). Influence of anaesthetic technique on maternal and foetal outcome in category 1 caesarean sections— A prospective single-centre observational study. *Indian Journal of Anaesthesia*, 62(11), 844.
- Wu, S. W., Dian, H., & Zhang, W. Y. (2018). Labor onset, oxytocin use, and epidural Anesthesia for vaginal birth after Cesarean section and associated effects on maternal and neonatal outcomes in a tertiary Hospital in China: A retrospective study. *Chinese medical journal*, 131(08), 933-938.